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(54) **SPOKED WHEEL FOR A BICYCLE**

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(52) **U.S. Cl.** **301/110.5**; 301/104; 301/74; 301/67
(58) **Field of Search** 301/104, 110.5, 301/110.6, 80, 81, 74, 67, 68, 69, 70, 71

(56) **References Cited**

U.S. PATENT DOCUMENTS

436,993	A	*	9/1890	Overman	152/327
1,934,102	A	*	11/1933	Stoler	301/104
4,844,552	A	*	7/1989	Tsygankov et al.	301/64.702
5,810,453	A	*	9/1998	O'Brien	301/59
6,024,413	A	*	2/2000	Dixon et al.	301/58
6,145,938	A	*	11/2000	Dietrich	301/59
6,367,883	B1	*	4/2002	Chen	301/55
6,382,734	B1	*	5/2002	Passarotto	301/55
6,386,644	B2	*	5/2002	Chen	301/110.5
6,409,278	B1	*	6/2002	Nakajima	301/59

* cited by examiner

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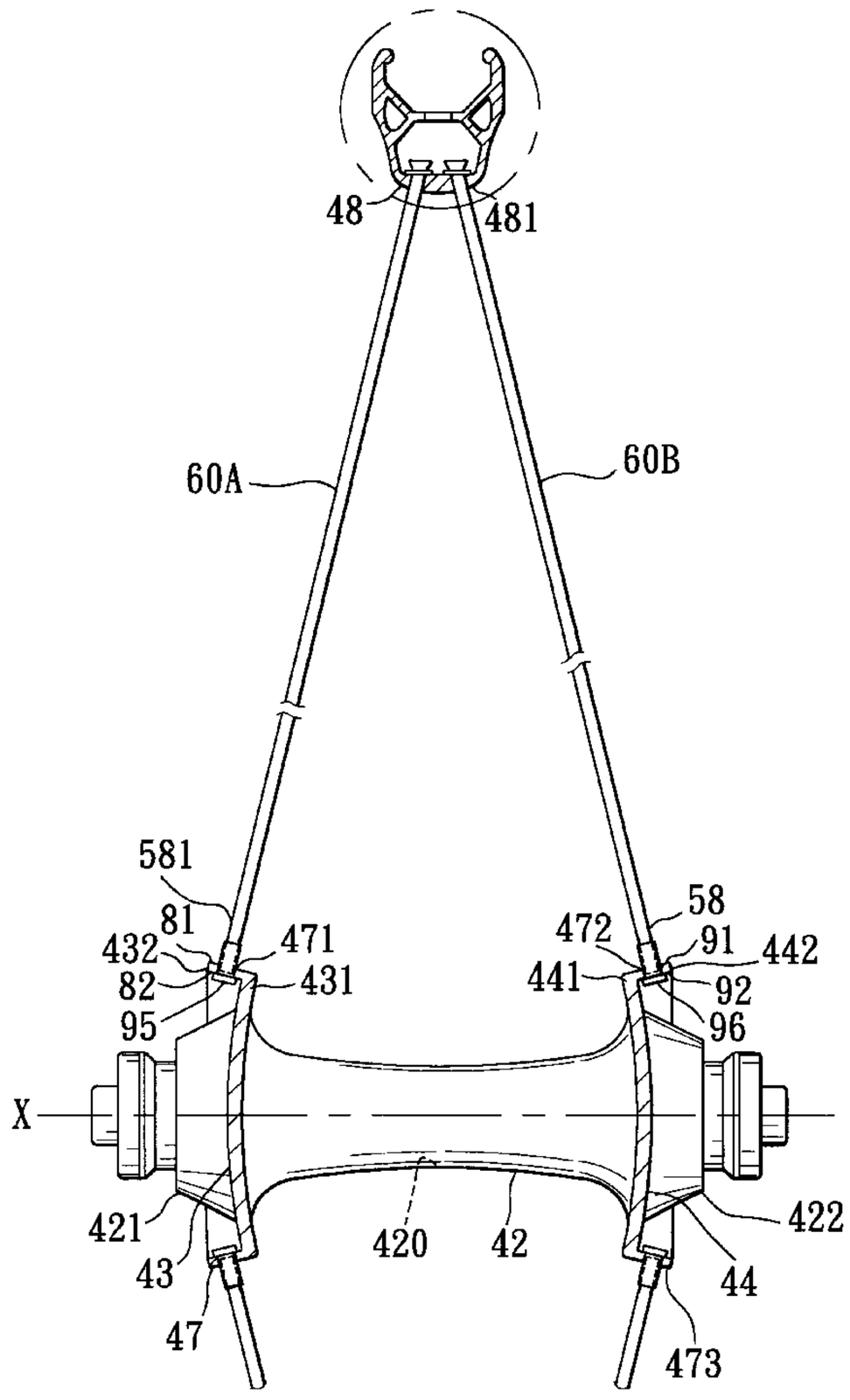
(57) **ABSTRACT**

A spoked wheel includes a wheel hub, an annular wheel rim, and a plurality of spoke units which are connected between the wheel hub and the wheel rim. The wheel hub has left and right surrounding mounts with left and right sets of first anchored loci. The wheel rim has left and right annular wall portions opposite to each other in an axial direction and formed with left and right sets of second anchored loci. The spoke units are received and retained via the first and second sets of anchored loci. The spoke units do not include bent portions for fastening to increase the strength thereof.

7 Claims, 6 Drawing Sheets



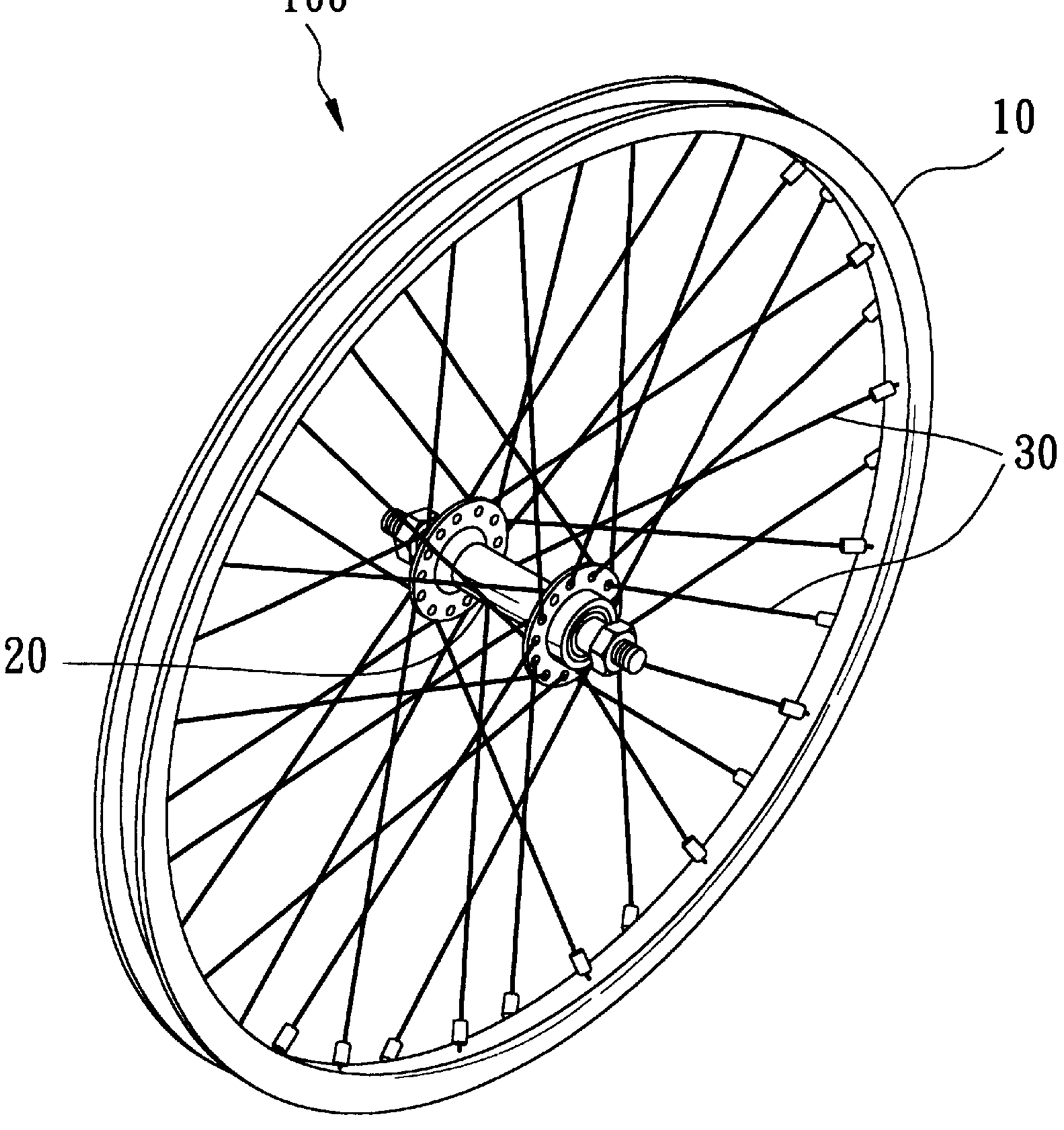


FIG. 1
PRIOR ART

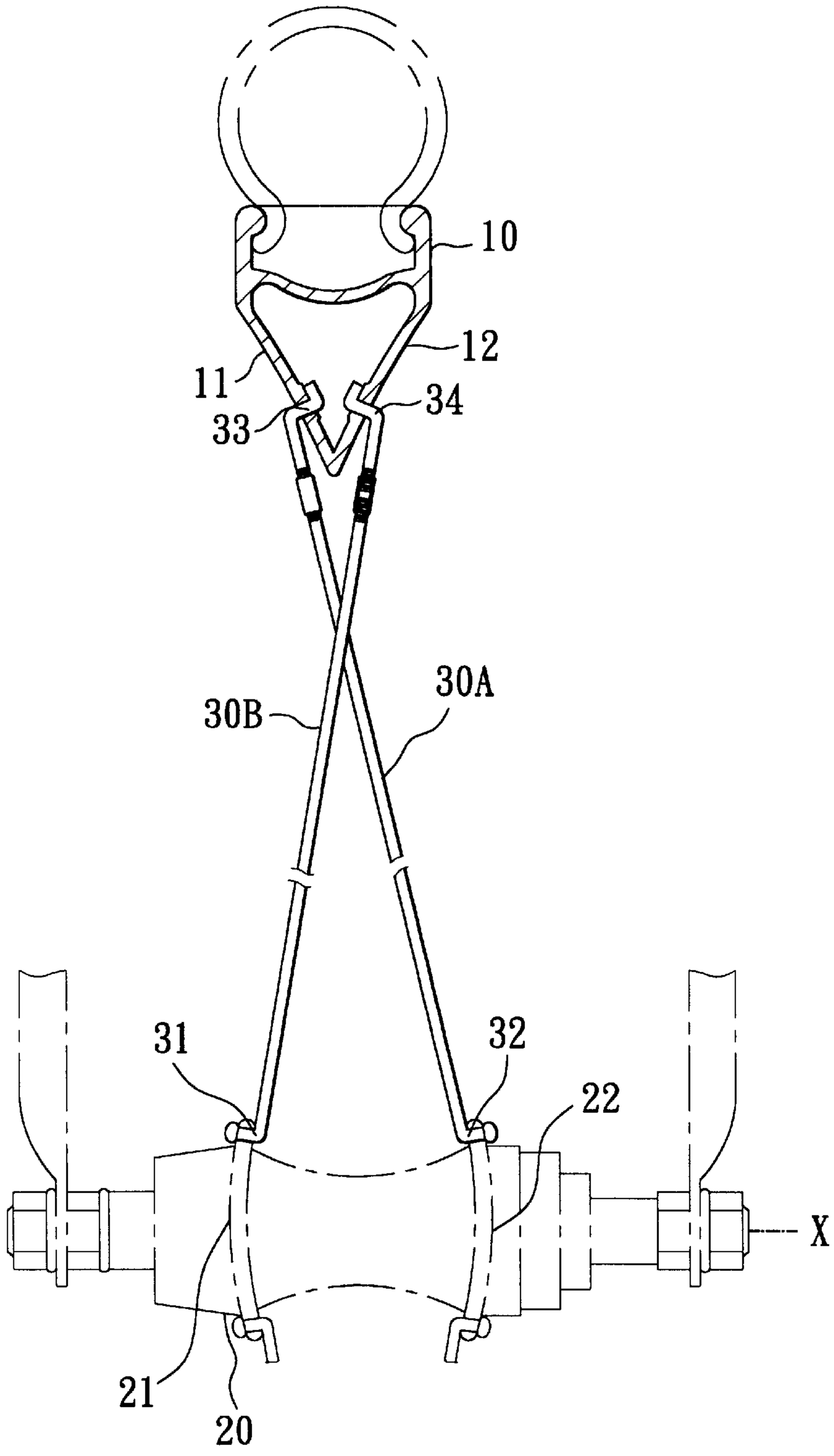


FIG. 2
PRIOR ART

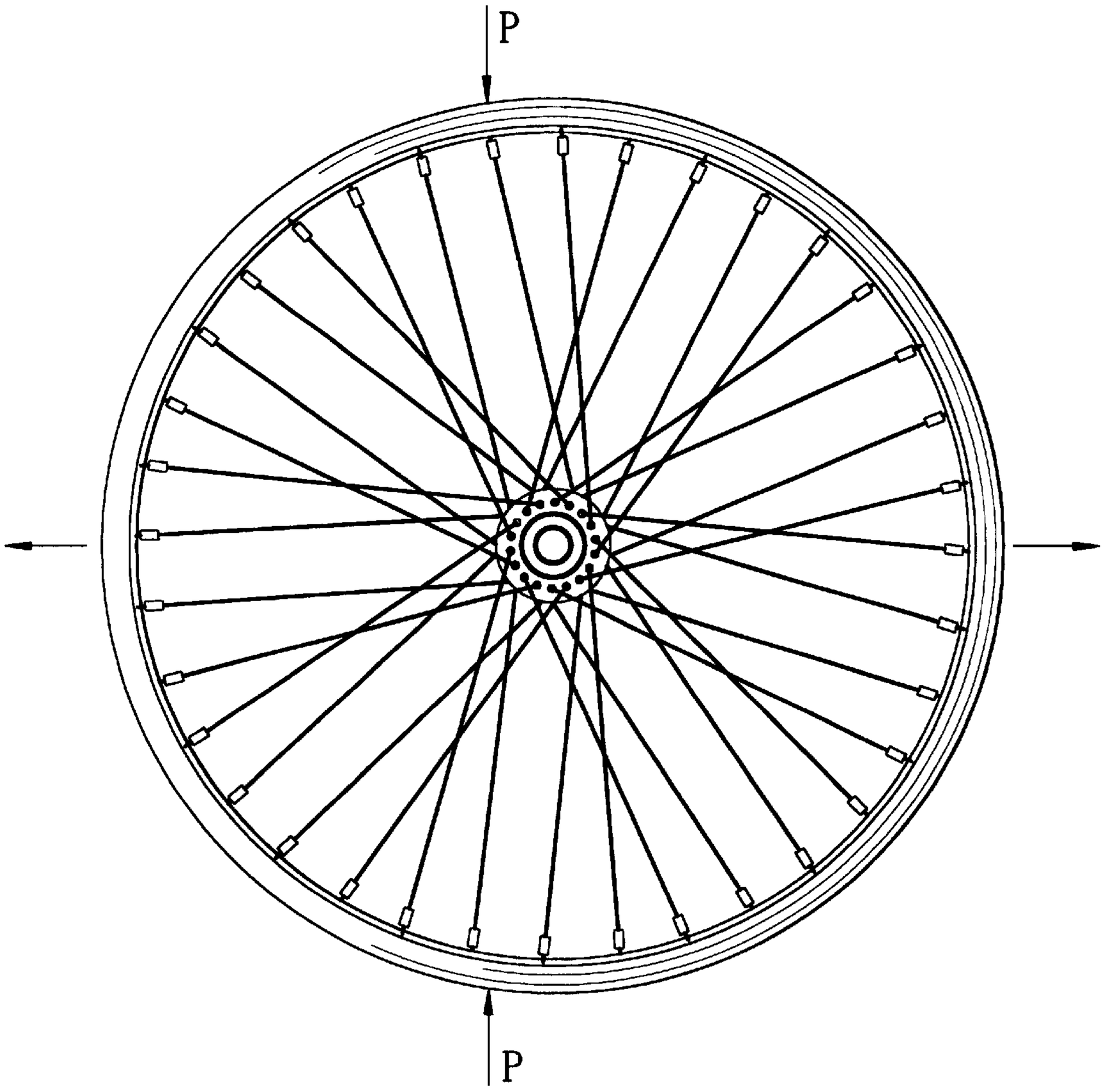


FIG. 3
PRIOR ART

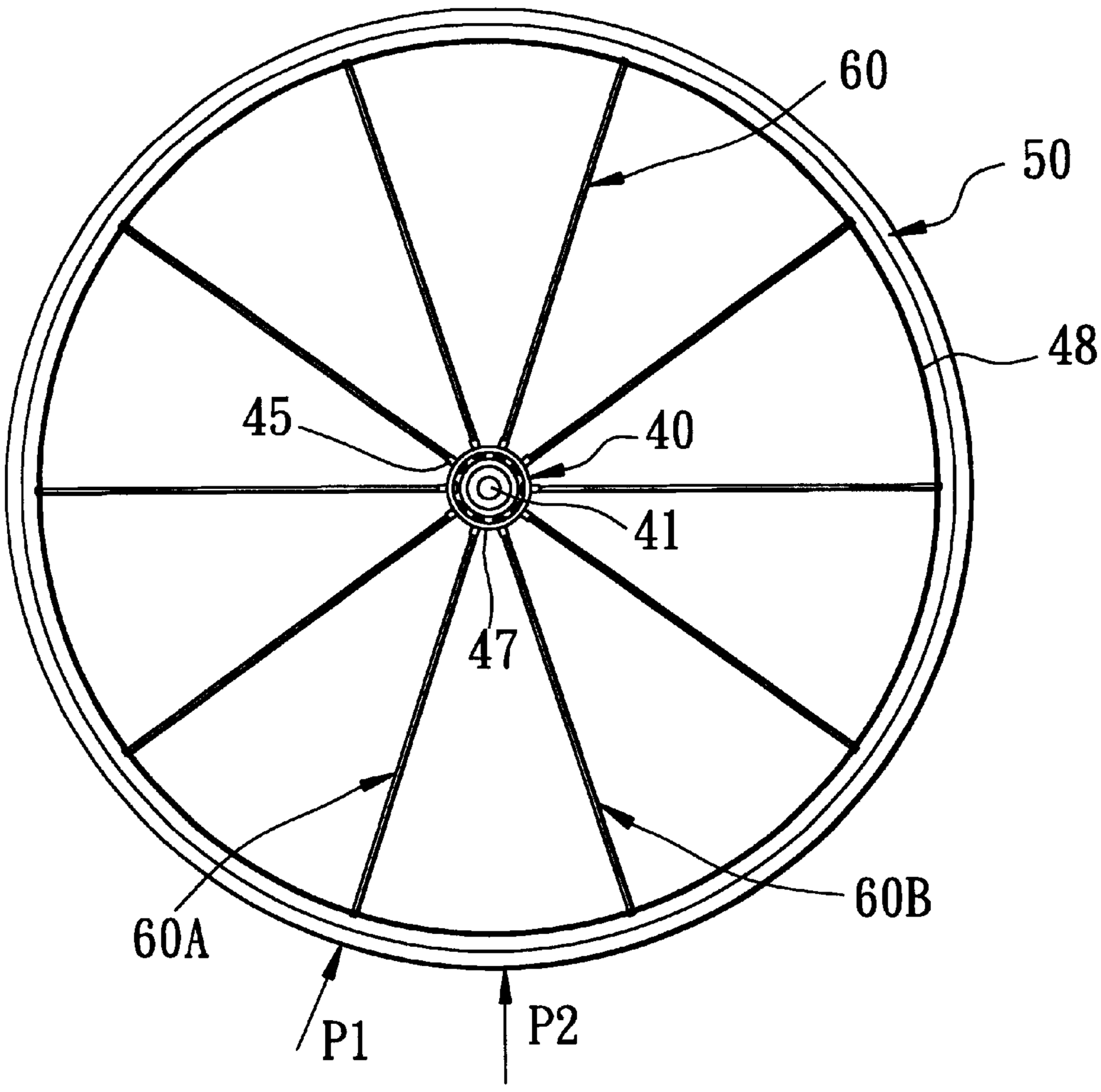


FIG. 4

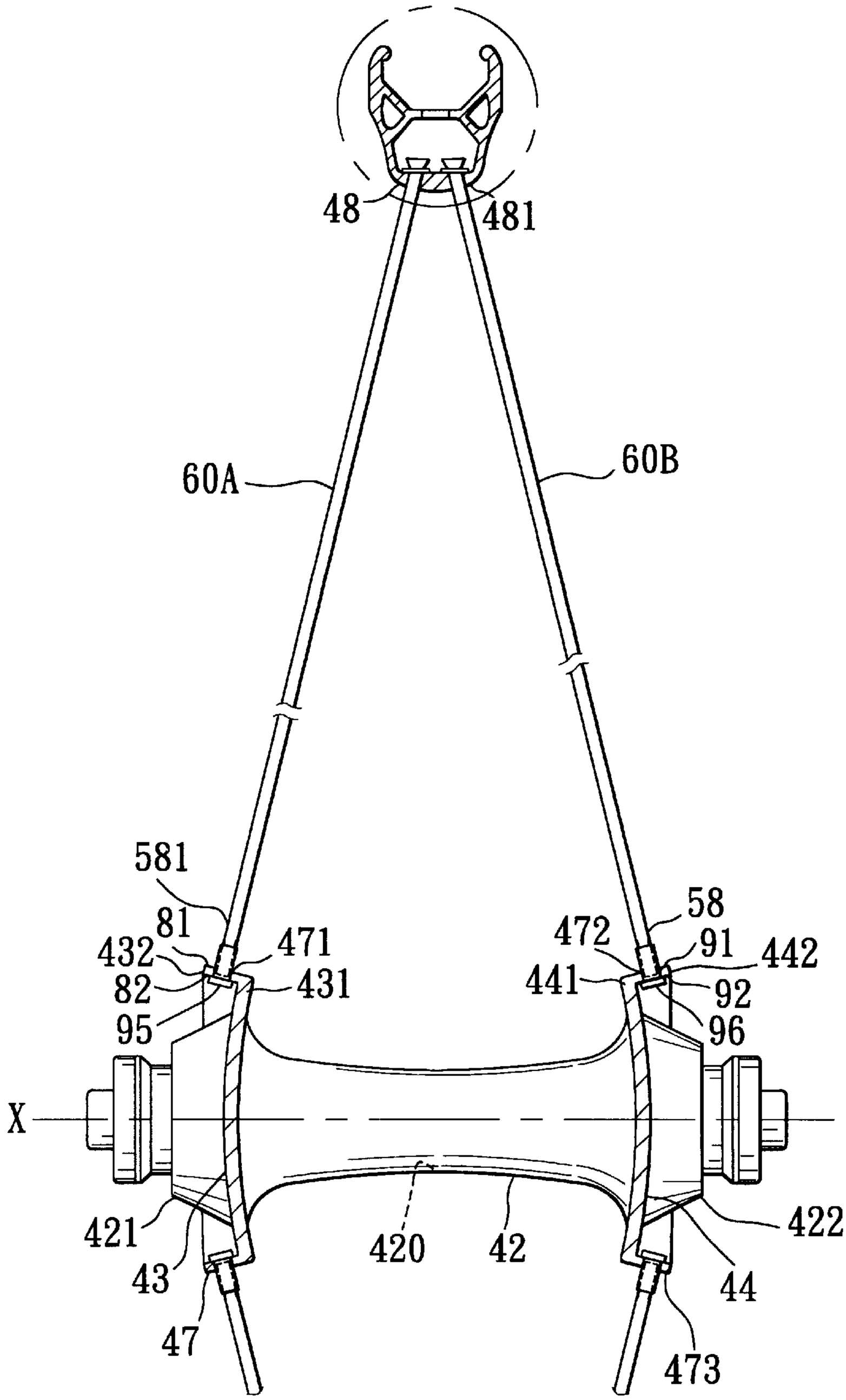

48
481
60A
60B
581
81
432
82
95
471
431
472
58
91
442
441
92
96
X
421
43
47
420
42
422
44
473

FIG. 5

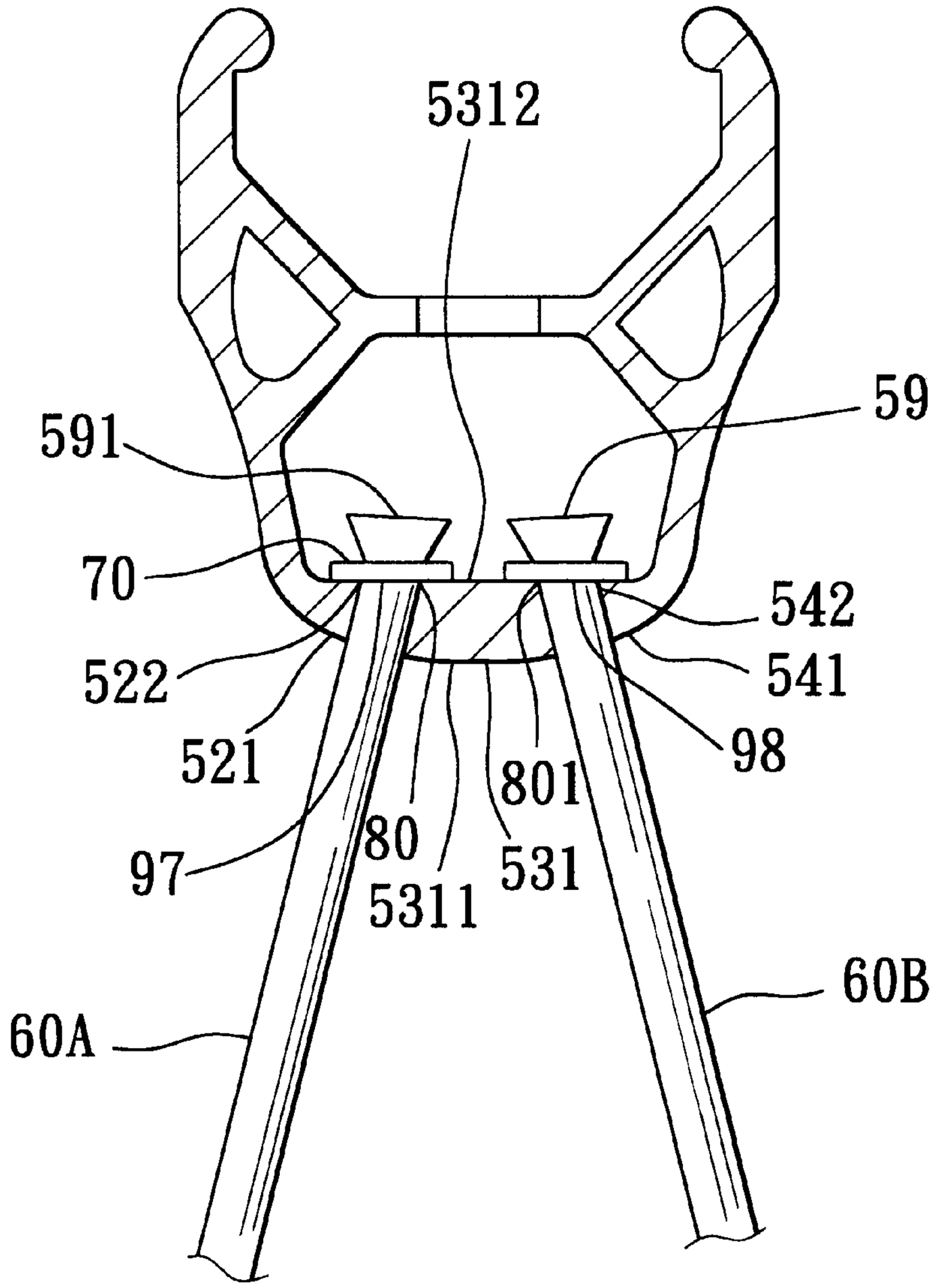


FIG. 6

SPOKED WHEEL FOR A BICYCLE

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a spoked wheel for a bicycle, more particularly to a spoked wheel with a plurality of spoke units that form coplanar planes.

2. Description of the Related Art

Referring to FIGS. **1** and **2**, a conventional spoked wheel **100** for a bicycle having an axle defining an axis is shown to include an annular wheel rim **10**, a wheel hub **20**, and a plurality of spokes **30**. The annular wheel rim **10** has a left annular rim wall **11** and a right annular rim wall **12** opposite to each other in an axial direction parallel to the axis of the axle. The left and right annular rim walls **11**, **12** have a plurality of first mounting holes angularly displaced from one another about the axis. Moreover, the wheel hub **20** includes a left flange **21** and a right flange **22** opposite to each other in the axial direction. The left and right flanges **21**, **22** have a plurality of second mounting holes angularly displaced from one another about the axis. The spokes **30** of a conventional spoked wheel **100** are hooked to the annular wheel rim **10** and the wheel hub **20** at corresponding ones of the first and second mounting holes. More particularly, the spoke **30**A is connected to the left annular rim wall **11** and the right flange **22**, while the spoke **30**B is connected to the right annular rim wall **12** and the left flange **21**. Furthermore, the spokes **30** have first bent portions **31**, **32** which are inserted through the second mounting holes in the corresponding one of the left and right flanges **21**, **22**. The spokes **30** further have second bent portions **33**, **34** which are inserted through the first mounting holes in the corresponding one of the left and right annular rim walls **11**, **12**.

The conventional spoked wheel **100** has several drawbacks. First, due to the spoke distribution, when under stress as shown in FIG. **3**, there are situations where the forces are not fully counteracted by any spoke which would, consequently, cause an unbalanced feeling during riding. Second, due to the alternate spoke arrangement, a major portion of the force could not desirably propagate along the length of each of the spokes on which the force is applied. In other words, the spoke bracing effect is not maximized. Last but not least, the forces tend to focus on the bent portions of the spokes **30** where deformation or breakage of the spokes **30** or wheel rim **10** would easily occur. Thus, the rigidity of the annular wheel rim **10** in a direction radial to the axis is relatively poor.

SUMMARY OF THE INVENTION

The object of the present invention is to provide a spoked wheel for a bicycle with unbent spokes presented in pairs to increase the strength of the wheel and to balance the forces applied onto the wheel.

According to this invention, a spoked wheel is adapted for use in a bicycle which has an axle defining an axis, and comprises a wheel hub which has an inner hub wall surface adapted to be rotatably mounted on the axle about the axis, and an outer hub wall surface opposite to the inner hub wall surface in radial directions. The outer hub wall surface includes left and right surrounding ends opposite to each other in an axial direction parallel to the axis. Left and right flanges extend in radial directions respectively from the left and right surrounding ends, and terminate respectively at left and right surrounding edges which are spaced apart from each other in the axial direction. Left and right surrounding mounts extend in the axial direction respectively from the left and right surrounding edges, and have left and right sets of first anchored sites, respectively. Each of the left and right sets of first anchored sites includes a plurality of first anchored loci angularly displaced from one another about the axis. An annular wheel rim is disposed to surround the wheel hub about the axis, and includes an annular rim wall surrounding and facing towards the outer hub wall surface. The annular rim wall includes left and right annular wall portions opposite to each other in the axial direction. The left and right annular wall portions have left and right sets of second anchored sites, respectively. Each of the left and right sets of second anchored sites includes a plurality of second anchored loci which are angularly displaced from one another about the axis. Each of left and right sets of spokes has a plurality of spoke units. Each of the spoke units includes proximate and distal anchoring ends which respectively engage a corresponding one of the first anchored loci and a corresponding one of the second anchored loci to form a plane such that left and right planes respectively formed by a corresponding pair of the first anchored loci, a corresponding pair of the second anchored loci, a corresponding pair of the proximate anchoring ends, and a corresponding pair of the distal anchoring ends, are coplanar with each other.

BRIEF DESCRIPTION OF THE DRAWINGS

Other features and advantages of the present invention will become apparent in the following detailed description of the preferred embodiment of the invention, with reference to the accompanying drawings, in which:

FIG. **1** is a perspective view of a conventional spoked tight wheel for a bicycle;

FIG. **2** is a schematic partially sectional view of a portion of the conventional spoked wheel of FIG. **1**;

FIG. **3** is a schematic side view of the conventional spoked wheel of FIG. **1**;

FIG. **4** is a schematic side view of the preferred embodiment of a spoked wheel according to the present invention;

FIG. **5** is a schematic sectional view of a portion of the preferred embodiment; and

FIG. **6** is an enlarged view of an encircled portion shown in FIG. **5**.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIGS. **4**, **5**, and **6**, the preferred embodiment of the spoked wheel according to this invention is to be used in a bicycle having an axle **41** defining an axis (X). The spoked wheel is shown to comprise a wheel hub **40**, an annular wheel rim **50**, a plurality of spokes **60**, and washers **70**. The wheel hub **40** includes an inner hub wall surface **420** and an outer hub wall surface **42**. The inner hub wall surface **420** is adapted to be mounted rotatably on the axle **41** about the axis (X) in a conventional manner. The outer hub wall surface **42** is opposite to the inner hub wall surface **420** in radial directions. The outer hub wall surface **42** includes left and right surrounding ends **421**, **422** opposite to each other in an axial direction parallel to the axis. Left and right flanges **43**, **44** extend in radial directions respectively from the left and right surroundings ends **421**, **422**, and terminate respectively at left and right surrounding edges **431**, **441** which are spaced apart from each other in the axial direction. Left and right surrounding mounts **432**, **442** extend in the axial direction respectively from the left and right surround-

ing edges **431**, **441**. The left and right surrounding mounts **432**, **442** have left and right sets of first anchored sites **47**, **473**. Each of the left and right sets of first anchored sites **47**, **473** includes a plurality of left and right first anchored loci **471**, **472**, respectively. The first anchored loci **471**, **472** are angularly displaced from one another about the axis (X). The annular wheel rim **50** is disposed to surround the wheel hub **40** about the axis (X), and includes an annular rim wall **531** surrounding and facing towards the outer hub wall surface **42**. The annular rim wall **531** has left and right annular wall portions **521**, **541** opposite to each other in the axial direction and having left and right sets of second anchored sites **48**, **481**, respectively. The left and right sets of second anchored sites **48**, **481** include a plurality of left and right second anchored loci **522**, **542**, respectively, which are angularly displaced from one another about the axis (X). Furthermore, each of left and right sets of spokes **60** has a plurality of left or right spoke units **60**A, **60**B. Each pair of left and right spoke units **60**A, **60**B includes left and right proximate anchoring ends **581**, **58** and left and right distal anchoring ends **591**, **59** which respectively engage a corresponding one of the first anchored loci **471**, **472**, and a corresponding one of the second anchored loci **522**, **542**, to form left and right planes such that the left and right planes respectively formed by a corresponding pair of the first anchored loci **471**, **472**, a corresponding pair of the second anchored loci **522**, **542**, a corresponding pair of the proximate anchoring ends **581**, **58**, and a corresponding pair of the left and right distal anchoring ends **591**, **59**, are coplanar with each other.

Preferably, the left and right planes extend from the axis (X) in radial directions. Each of the spoke units **60**A, **60**B is adjustable along the length thereof relative to the corresponding ones of the first and second anchored loci **471**, **472**, **522**, **542**. More preferably, the annular rim wall **531** includes outer and inner rim surfaces **5311**, **5312** opposite to each other in radial directions and proximate and distal to the outer hub wall surface **42**, respectively. The second anchored loci **522**, **542** have left and right insert holes **80**, **801** extending through the outer and inner rim surfaces **5311**, **5312**. The left and right surrounding mounts **432**, **442** have left and right upper mount surfaces **81**, **91** and left and right lower mount surfaces **82**, **92** opposite to each other in radial directions. The first anchored loci **471**, **472** have left and right tightening holes **95**, **96** extending through the upper mount surfaces **81**, **91** and the lower mount surfaces **82**, **92**. The spoke units **60**A, **60**B are received and retained in a corresponding one of the left and right tightening holes **95**, **96** and a corresponding one of the left and right insert holes **80**, **801**. Moreover, each of the left and right distal anchoring ends **591**, **59** is enlarged such that once the spoke units **60**A, **60**B are inserted into the left and right insert holes **80**, **801**, the left and right distal anchoring ends **591**, **59** are retainingly engaged in the left and right insert holes **80**, **801**. Furthermore, each of a plurality of tightening nuts **45** is disposed to threadedly engage the proximate anchoring end **581**, **58** of a corresponding one of the spoke units **60**A, **60**B such that movement of the tightening nut **45** relative to the proximate anchoring end **581**, **58** via threaded engagement will result in movement of the distal anchoring end **591**, **59** toward the insert hole **80**, **801** so as to abut against the corresponding one of the second anchored loci **522**, **542** and tighten the corresponding one of the spoke units **60**A, **60**B. A plurality of washers **70** are sleeved respectively on the spoke units **60**A, **60**B between a corresponding one of the distal anchoring ends **591**, **59** and a corresponding one of the second anchored loci **522**, **542**.

While the present invention has been described in connection with what is considered the most practical and preferred embodiment, it is understood that this invention is not limited to the disclosed embodiment but is intended to cover various arrangements included within the spirit and scope of the broadest interpretations and equivalent arrangements.

I claim:

1. A spoked wheel for a bicycle which has an axle defining an axis, comprising:

a wheel hub which has an inner hub wall surface adapted to be rotatably mounted on the axle about the axis, and an outer hub wall surface opposite to said inner hub wall surface in radial directions, said outer hub wall surface including left and right surrounding ends opposite to each other in an axial direction parallel to the axis;

left and right flanges extending in radial directions respectively from said left and right surrounding ends and terminating respectively at left and right surrounding edges which are spaced apart from each other in the axial direction;

left and right surrounding mounts extending in the axial direction respectively from said left and right surrounding edges, said left and right surrounding mounts having left and right sets of first anchored sites respectively, each of said left and right sets of first anchored sites including a plurality of first anchored loci angularly displaced from one another about the axis;

an annular wheel rim which is disposed to surround said wheel hub about the axis, and which includes an annular rim wall surrounding and facing towards said outer hub wall surface, said annular rim wall including left and right annular wall portions opposite to each other in the axial direction, said left and right annular wall portions having left and right sets of second anchored sites respectively, each of said left and right sets of second anchored sites including a plurality of second anchored loci which are angularly displaced from one another about the axis; and

left and right sets of spokes, each set having a plurality of spoke units, each of said spoke units including proximate and distal anchoring ends which respectively engage a corresponding one of said first anchored loci and a corresponding one of said second anchored loci to form a plane such that left and right planes respectively formed by a corresponding pair of said first anchored loci, a corresponding pair of said second anchored loci, a corresponding pair of said proximate anchoring ends, and a corresponding pair of said distal anchoring ends, are coplanar with each other.

2. A spoked wheel according to claim **1**, wherein said left and right planes extend radially from the axis.

3. A spoked wheel according to claim **2**, wherein each of said spoke units is adjustable along the length thereof relative to the corresponding ones of said first and second anchored loci.

4. A spoked wheel according to claim **3**, wherein said annular rim wall includes outer and inner rim surfaces opposite to each other in radial directions, and proximate and distal to said outer hub wall surface respectively, each of said second anchored loci having an insert hole which extends through said outer and inner rim surfaces, each of said left and right surrounding mounts having upper and lower mount surfaces opposite to each other in radial

directions, each of said first anchored loci having a tightening hole extending through said upper and lower mount surfaces, said proximate and distal anchoring ends of each of said spoke units being respectively received and retained in a corresponding one of said tightening holes and a corresponding one of said insert holes.

5. A spoked wheel according to claim **4**, wherein each of said distal anchoring ends is enlarged such that once said spoke units are inserted into said insert holes, said distal anchoring ends are retainingly engaged in said insert holes.

6. A spoked wheel according to claim **5**, further comprising a plurality of tightening nuts, each disposed to threadedly engage said proximate anchoring end of a corresponding one of said spoke units such that movement of said tightening nut relative to said proximate anchoring end via threaded engagement will result in movement of said distal anchoring end towards said insert hole so as to abut against said corresponding one of second anchored loci and tighten said corresponding one of said spoke units.

7. A spoked wheel according to claim **6**, further comprising a plurality of washers sleeved respectively on said spoke units between a corresponding one of said distal anchoring ends and a corresponding one of said second anchored loci.

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